EUROPEAN COMMISSION
Information Society and Media Directorate General

Lisbon Strategy and Policies for the Information Society
Lisbon Strategy and i2010

Use of Computers and the Internet in Schools in Europe 2006

Country Brief: Denmark

6 / 2006

Key findings

Denmark is one of if not the European frontrunner in terms of ICT use in schools! All Danish schools use computers for teaching and have internet access. With 27 computers per 100 pupils, Denmark is the European country where schools are best equipped with computers. The same holds true for the internet access, virtually all schools use the internet in class. There are no differences according to locality, i.e. the situation is the same in urban as well as in rural areas, and according to school types.

With 95% of schools connected to the internet through broadband, Denmark is about to reach the 100% saturation point. ICT and internet in general and mostly broadband internet are ubiquitously available and in use in all schools in Denmark.

It appears as if ICT has almost entirely become an integral part of any subject without any further need of training pupils in its use as part of a dedicated subject. More than 90% of teachers use computers and the internet integrated into the teaching of most subjects, including foreign languages, as well as teaching pupils with special needs or handicaps. This holds true for all schools, whether they are located in urban or rural areas, and for all school types.

95% of Danish classroom teachers have used computers in class in the 12 months prior to the survey, with basically no variation across school types and between urban and rural areas. For most teachers, this includes not only using a computer for presentation purposes but also the use of computers by pupils in class.

Almost 50% of teachers use computers in up to 25% of their lessons, and slightly more than 50% in more than 25% of their lessons with hardly any difference according to age of teachers.

Only 5% of teachers do not use computers in class in Denmark. Asked for the most important barrier, 40% of the teachers not using computers in class state that the subject does not lend itself to being taught via computers. Lack of motivation for using ICT in class as expressed by 20% of the Danish teachers seems to be the most critical point in a country where ICT is already extensively used and fully integrated in the subjects in all types of schools and for a multitude of purposes.

It therefore does not come as a surprise that a mere 1.5% of all Danish teachers state "lack of equipment in school" as an important issue.

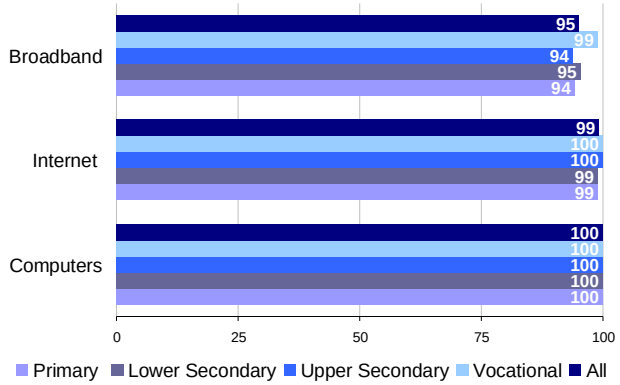
Computers and the internet have become a fully integral part of the teaching process in all schools in Denmark.

ICT Equipment and Internet in Schools

Denmark is one of if not the European frontrunner in terms of ICT use in schools! All Danish schools now use computers for teaching and have internet access. With 27 computers per 100 pupils, Denmark is the country where schools are best equipped with computers. The same holds true for internet access: virtually all schools use the internet in class. There are no differences according to locality, i.e. the situation is the same in urban as well as in rural areas, and according to school types. Only in primary schools has the 100% mark not quite been reached but stays at an impressive 97% for computer use and 95% for internet access.

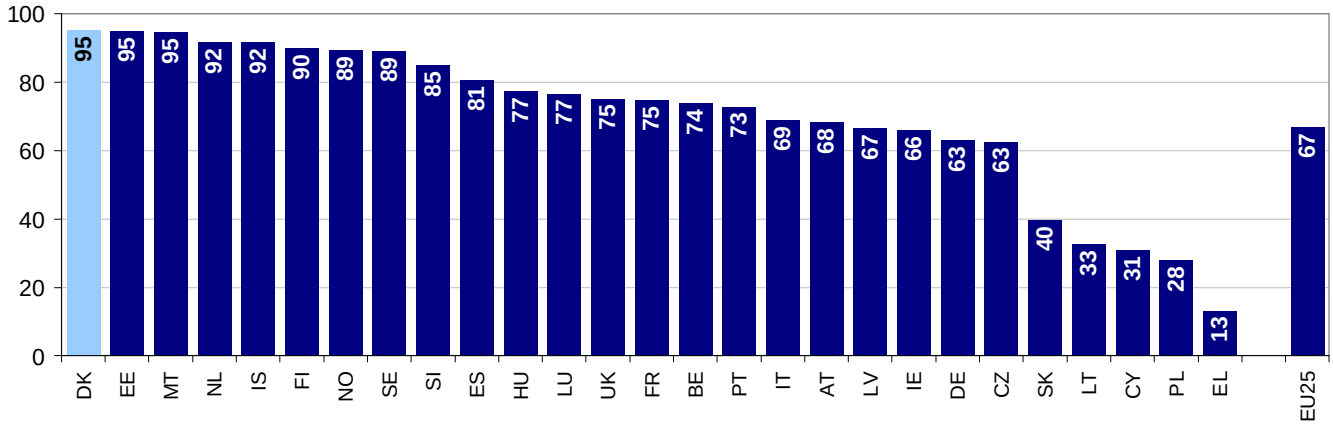
95% use the internet via a broadband connection. With this figure Denmark ranks at number 1 of the 27 countries participating in the survey. There is no variation between school types and type of locality. ICT and internet in general and mostly broadband internet are ubiquitously available and in use in all schools in Denmark.

Percentage of Schools Using Computers, Internet Connection, and Broadband Internet Access According to School Type in Denmark 2006



Source: *LearnInd HTS 2006;* ***Base:*** *All schools;* ***Question:*** *Computers: Q6; Internet, Broadband: Q9. See questionnaire for exact wording.*

Percentage of Schools with Broadband Internet Access in Europe 2006



Source: *LearnInd HTS 2006;* ***Base:*** *All schools;* ***Question:*** *Q9. See questionnaire for exact wording.*

ICT equipment in Danish schools 2006

			Educational Level (DK)				Type of locality (DK)			Internet Access (DK)	
	Total DK	Total EU25	Primary	Lower secondary	Upper secondary	Vocational	Densely populated	Inter-mediate	Thinly populated	Narrow-band	Broadband
Computers per 100 pupils [a]	27.3	11.3	18.6	18.4	37.3	50.3	25.5	30.5	26.0	*30.0**	27.3
... of which internet connected	26.3	9.9	17.9	17.9	37.2	48.0	25.2	28.6	25.2	*28.0**	26.3
Percentage of schools having...											
Computers for teaching [b]	100.0	98.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	*100.0**	100.0
Internet access [c]	99.2	96.2	98.9	98.9	100.0	100.0	100.0	98.4	99.3	*100.0**	100.0
Broadband internet access [d]	95.1	66.9	94.1	95.4	93.7	98.9	95.7	98.4	93.1	*0.0**	100.0
A website [e]	98.7	63.0	98.1	98.1	100.0	100.0	100.0	96.4	99.3	*100.0**	99.4
An e-mail address for the majority of teachers [f]	89.5	65.2	87.1	88.6	86.9	94.1	93.8	89.6	87.5	*88.7**	90.2
An e-mail address for the majority of pupils [g]	57.5	23.5	62.3	57.8	62.6	48.0	52.4	65.5	55.5	*74.0**	57.2
A LAN [h]	73.9	55.2	66.3	70.5	96.5	90.6	83.8	75.8	68.4	*34.1**	76.2
An intranet [i]	73.4	40.8	70.9	73.5	86.2	74.5	82.1	67.8	72.5	*66.0**	74.3
An external support or maintenance contract [j]	52.6	47.1	53.5	52.6	49.7	55.6	56.0	61.6	46.3	*43.7**	53.4
Percentage of schools using computers for education in…											
Computer labs [k]	90.6	80.5	91.0	94.2	96.2	84.7	93.1	89.9	89.9	*84.9**	90.8
Classrooms [l]	71.5	61.4	72.1	69.9	67.2	80.1	73.9	63.9	74.6	*86.2**	71.5
School library [m]	71.0	33.4	81.3	75.0	76.9	37.3	81.5	69.6	67.1	*84.9**	71.0
Other locations accessible for pupils [n]	78.1	27.0	82.0	78.3	80.4	67.2	87.2	83.7	71.1	*80.1**	78.3

Source: *LearnInd HTS 2006;* ***Base:*** *a: all pupils; b-j: all schools, k-n: schools using computers for educational purposes for pupils (cf. index b);* ***Question:*** *a: Q4, Q6, Q7; b: Q6; c: Q9; d: Q9; e-j: Q12; k-n: Q8. See questionnaire for exact wording.* ***Notes:*** *"xx.x*": based on at least 10 and less than 50 cases.*

98% of schools have a website, 90% offer e-mail to teachers, and 58% do so to pupils. 72% of the Danish schools using computers for teaching use them in classrooms, with the highest percentage being achieved in upper secondary schools (96%). 90% also use them in computer labs and 71% in the school library no matter which school type. With 78% of Danish schools offering computers in other locations that are accessible to pupils in the school, Denmark ranks top in Europe. The figure achieved is about three times higher than the EU25 average of 27%.

Those schools with a broadband connection to the internet are much more likely to have a more sophisticated ICT infrastructure including a school website, the use of a LAN or the availability of an intranet.

The use of Computers and the Internet in Schools

In Denmark, computers are used for various purposes and as part of teaching different subjects in schools but hardly at all as a separate subject. The latter is striking since only around a third of Danish schools teach it as a separate subject. This compares to more than half of the schools in Europe.

It appears as if ICT has almost entirely become an integral part of any subject without any further need of training pupils in its use as part of a dedicated subject. More than 90% of teachers use computers and the internet integrated into the teaching of most subjects, including foreign languages, as well as teaching pupils with special needs or handicaps. This holds true for all schools, whether they are located in urban or rural areas, and for all school types. With respect to using ICT for teaching foreign languages, Denmark again is the European frontrunner with 95% of the schools stating this to be the case compared to a European average of 57%.

95% of Danish classroom teachers had used computers in class in the 12 months prior to the survey, with basically no variation across school types and between urban and rural areas. For most teachers, this includes not

only using a computer for presentation purposes but also the use of computers by pupils in class.

Use of computers in class in Denmark 2006

Assessments of the head teacher		Total DK	Total EU25	Educational Level (DK)				Type of locality (DK)			Internet Access (DK)	
				Primary	Lower secondary	Upper secondary	Vocational	Densely populated	Inter-mediate	Thinly populated	Narrow-band	Broadband
Computer sciences taught as separate subject	Agree	35.8	54.7	32.1	34.1	42.3	56.5	50.0	27.3	34.1	*51.4**	35.1
	Disagree	63.1	43.7	67.2	65.2	49.0	38.8	49.4	70.4	65.3	*48.6**	63.8
	Don't know	1.1	1.6	0.7	0.7	8.7	4.6	0.6	2.4	0.5	*0.0**	1.1
Computers and the internet are												
integrated into teaching of most subjects	Agree	89.2	75.3	88.0	89.7	90.6	87.2	87.3	89.7	89.9	*85.9**	90.1
	Disagree	9.7	24.1	10.5	8.8	4.0	12.8	12.7	6.4	10.1	*14.1**	8.8
	Don't know	1.0	0.6	1.4	1.5	5.5	0.0	0.0	3.8	0.0	*0.0**	1.1
used for teaching traditional subjects or basic skills	Agree	93.1	75.8	94.9	92.7	85.6	95.3	94.5	95.3	91.3	*88.7**	93.6
	Disagree	5.2	22.8	3.8	5.9	5.2	4.7	5.1	2.5	6.6	*11.3**	4.6
	Don't know	1.8	1.4	1.3	1.4	9.2	0.0	0.5	2.2	2.1	*0.0**	1.8
used for teaching foreign languages	Agree	95.4	56.6	96.2	96.1	92.8	89.4	96.6	95.9	94.5	*100.0**	95.5
	Disagree	3.2	40.1	2.5	2.5	1.7	6.9	3.4	0.6	4.6	*0.0**	3.0
	Don't know	1.4	3.3	1.3	1.3	5.5	3.7	0.0	3.5	0.9	*0.0**	1.5
used for teaching students with special needs/ handicaps	Agree	94.0	71.7	95.5	94.0	83.3	96.8	96.7	93.3	93.1	*77.1**	95.0
	Disagree	3.1	23.7	2.4	3.1	4.0	1.1	2.1	1.9	4.2	*11.6**	2.4
	Don't know	2.9	4.6	2.1	2.9	12.7	2.1	1.2	4.7	2.6	*11.3**	2.5

Source: *LearnInd HTS 2006;* ***Base:*** *All schools using computers for educational purposes for pupils;* ***Question:*** *Q13: "To what extent do you agree or disagree with the following statements regarding the educational use of computers and/or the internet in your school?"* ***Notes:*** *"xx.x*": based on at least 10 and less than 50 cases.*

49% of those teachers using computers use them in less than 10% of all lessons. Only 6% state that they use computers in more than half of their lessons. Teachers in vocational schools use computers in class much more frequently than their colleagues in general education with almost half of them using computers in more than a quarter of their lessons. With these figures, Danish schools are very well equipped with ICT but do not belong to the most intensive users of ICT in classrooms.

Danish teachers using computers do not restrict themselves to a particular source of information but use a multitude of different material from a variety of sources for teaching purposes which in most categories is above the European average. They are also very active (85%) in searching for material themselves in the internet. This shows a very proactive behaviour.

Compared to schools in many other countries, offline learning materials such as CD-ROMs are not that popular in Denmark. Only 57% compared to 83% in Europe use this source of information.

In most European countries it appears that the older the teachers (indicator used here: years of teaching experience), the less use they make of computers and the internet in schools. This is not the case in Denmark: almost 50% of the teachers use it up to 25% of their lessons, and slightly more than 50% in more than 25% of their lessons with hardly any difference according to age.

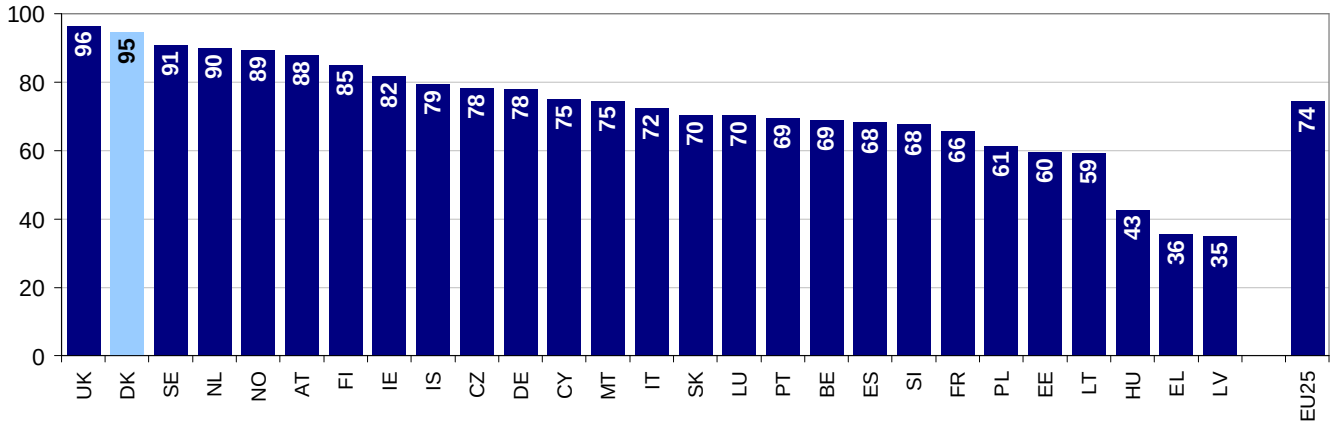
The most intensive ICT users – also in terms of intensity of use – can be found among teachers in vocational schools. Apart from that, there are hardly any differences according to intensity of use according to school type.

Only 5% of teachers do not use computers in class in Denmark. Asked for the most important barrier, 40% of the teachers not using computers in class state that the subject does not lend itself to being taught via computers.

Lack of computers is stated by 31% of the teachers not using computers in class. One has to bear in mind that we are talking about a very small group of individuals here.

This results in a situation where the statement “lack of equipment in school” is expressed by a just 1.5% of all Danish teachers (5% non-users multiplied with 31% of teachers agreeing to this item). The differences to the European average are striking since for the whole of Europe this group amounts to 13% of all teachers as opposed to less than 2% in Denmark.

Percentage of teachers who have used computers in class in the last 12 months (2006)



Source: *LearnInd CTS 2006;* ***Base:*** *All teachers;* ***Question:*** *Q7. See questionnaire for exact wording*

Teachers' use of computers in class in Denmark 2006

Percentage of teachers who ...	Total DK	Total EU25	Educational Level (DK)				Type of locality (DK)			Years of teaching experience (DK)			
			Primary	Lower secon-dary	Upper secon-dary	Voca-tional	Densely popu-lated	Inter-mediate	Thinly popu-lated	<5 y	5-9 y	10-19 y	20+ y
...have used computers in class[1]	94.6	74.3	95.7	94.4	97.8	93.5	93.7	95.1	94.7	89.7	95.6	96.2	95.8
...use a computer in class to present or demonstrate	55.4	63.4	54.0	54.7	61.3	64.2	52.5	57.4	55.6	54.4	52.6	57.4	56.0
...have pupils use a computer in class	92.5	66.3	94.2	93.1	91.5	89.4	92.0	94.2	91.9	88.0	91.2	94.0	94.6

Source: *LearnInd CTS 2006;* ***Base:*** *All teachers;* ***Question:*** *Q7 "How have you used computers and/or the internet for work in the last 12 months?"*

Frequency of computers use in class Denmark 2006

Percentage of all teachers *using computers in class* who ...	Total DK	Total EU25	Educational Level (DK)				Type of locality (DK)			Years of teaching experience (DK)			
			Primary	Lower secon-dary	Upper secon-dary	Voca-tional	Densely popu-lated	Inter-mediate	Thinly popu-lated	<5 y	5-9 y	10-19 y	20+ y
...use computers in 5% and less of all lessons	16.6	18.5	18.6	18.1	11.2	11.8	19.2	15.3	16.1	19.5	17.4	21.6	12.4
in 6 to 10% of lessons	31.9	22.5	34.3	33.3	29.9	22.0	34.7	34.7	29.2	36.7	29.1	16.2	38.4
in 11 to 24% of lessons	28.9	22.2	30.3	29.2	30.7	20.5	26.8	25.4	31.6	26.6	31.1	35.8	25.6
in 25 to 50% of lessons	16.9	20.2	14.9	16.3	15.1	21.4	12.6	19.0	17.7	12.7	14.7	18.9	18.9
more than 50% of lessons	5.8	16.5	1.9	3.1	13.0	24.3	6.7	5.6	5.5	4.5	7.7	7.6	4.7

Source: *LearnInd CTS 2006;* ***Base:*** *Teachers using computers in class, "don't know" answers excluded;* ***Question:*** *Q9 "For what percentage of time have you used computers and/or the internet in class when teaching your main subject(s) in the past 12 months?"*

Source of educational material used in class in Denmark 2006

Percentage of all teachers *using computers in class*[2] who ...	**Total DK**	**Total EU25**	**Educational Level**				**Type of locality**		
			Primary	**Lower secondary**	**Upper secondary**	**Vocational**	**Densely populated**	**Inter-mediate**	**Thinly populated**
...use material they have searched the internet for	84.9	82.7	82.6	84.9	92.5	84.3	89.1	84.9	83.0
...use existing online material from established educational sources	76.2	74.2	78.5	79.5	81.0	64.0	77.0	80.1	73.8
...use material that is available on the school's computer network or database	75.7	63.1	75.4	76.0	79.3	72.1	66.8	77.1	78.9
...use electronic offline material (such as CD ROMS)	56.8	83.0	53.8	55.1	66.7	66.2	56.6	59.9	55.3
...use other learning material when using computers in class	6.6	8.8	5.8	5.6	10.2	12.9	7.7	8.2	5.4

Source: *LearnInd CTS 2006;* ***Base:*** *Teachers using computers in class;* ***Question:*** *Q10 "Which of the following types of materials have you used when teaching your main subject(s) with the aid of a computer and/or the internet*

Barriers to computer use in class in Denmark 2006

Percentage of all teachers ***not*** *using computers in class*	Total DK	Total EU25	Educational Level				Type of locality		
			Primary	Lower secondary	Upper secondary	Vocational	Densely populated	Inter-mediate	Thinly populated
Lack of computers	*30.9**	48.8	*28.3**	*37.1**	*24.4***	*0.0**	*42.1**	*13.8**	*33.4**
Lack of adequate content/material	*11.7**	20.3	*7.2**	*14.0**	*0.0***	*10.5**	*13.0**	*17.2**	*8.3**
Lack of content in national language	*5.0**	8.6	*0.0**	*4.7**	*50.0***	*5.3**	*19.2**	*0.0**	*0.0**
Lack of adequate skills of teachers	*19.1**	22.5	*7.2**	*18.6**	*24.4***	*31.6**	*35.4**	*6.7**	*16.6**
No or unclear benefits	*15.9**	16.2	*14.6**	*14.3**	*49.0***	*31.1**	*19.2**	*28.1**	*8.0**
Lack of interest of teachers	*1.6**	8.9	*0.0**	*0.0**	*0.0***	*10.7**	*3.1**	*3.3**	*0.0**
Subject does not lend itself to being taught via computers	*40.0**	24.4	*35.7**	*34.9**	*75.4***	*58.1**	*31.7**	*65.2**	*31.8**
Other	*24.3**	21.3	*42.7**	*23.4**	*0.0***	*5.3**	*26.1**	*14.3**	*28.4**

Source: *LearnInd CTS 2006;* ***Base:*** *all teachers not using computers in class;* ***Question:*** *Q12: "Why do you not use computers and/or the internet when teaching in class?"* ***Notes:*** *"xx.x*": based on at least 10 and less than 50 cases; "xx.x** " based on less than 10 cases.*

Comparison of the situation in 2001 and 2006[3]

In Denmark the percentage of schools using computers for educational purposes in 2001 already reached 99%. Today, basically all Danish schools use ICT in class and are connected to the internet.

In 2001 as well as in 2006 one hundred pupils had to share around 30 computers which compares to a European average of 12 and is the top result in Europe.

Schools have moved over to broadband. 95% (EU25: 45%) of the schools in Denmark are connected to the internet via a DSL connection in 2006. The figure for 2001 was 46% (EU15: 5%). The figure has again increased strongly over the past 5 years and is about to reach the 100% saturation point.

Schools have also strongly increased the quality of ICT use: while in 2001 75% (EU15: 44%) of the schools in Denmark had their own website, its now 99% (EU25: 62%). Also the use of a LAN – which was used by 66% (EU15: 47%) of the Danish schools – is now up to 74% (EU25: 54%).

With these figures, Denmark had already reached a top position in Europe in 2001 and has further developed and further improved its performance over the past years

Attitudes on the usefulness of ICT use in Teaching

Computers and the internet have become a fully integral part of the teaching process in all schools in Denmark..

The share of teachers in Denmark – but also in the European Union in general – who believe that computers and the internet should not at all be used in schools, is very low, at just 0.3%. Danish teachers have positive attitudes about the different applications of ICT in teaching and achieve high figures (around or above the European average) on attitudes that ICT should be used for letting pupils do exercises and practice (78%), letting pupils retrieve information in a self-directed manner (94%) and for collaborative and productive work by pupils (95%). There are only very small differences across school types. The majority of Danish teachers (52%) still believe that teaching about office tools should be an integral part of the teaching process. With this figure, the country ranks below the EU25 average figure. There are hardly any differences on this across the different school types. It is interesting that there is no common pattern across the European countries. In some countries (e.g. the UK, Norway, Iceland, Cyprus but also Spain) teachers in primary schools express this opinion much more strongly and to a larger extent compared to those at higher-level schools.

Attitudes on the Usefulness of ICT use in Teaching in Denmark 2006

Percentage of teachers saying computers/internet should be used for …	Total DK	Total EU25	Educational Level				Type of locality		
			Primary	Lower secondary	Upper secondary	Vocational	Densely populated	Inter-mediate	Thinly populated
Letting pupils do exercises and practise	78.4	79.9	79.1	78.2	83.2	73.9	75.3	85.0	76.3
Letting pupils retrieve information in a self-directed manner	94.2	85.0	93.9	95.3	91.1	95.9	90.9	95.7	94.9
Teaching about office tools	51.6	61.3	51.3	51.9	44.0	53.2	47.8	51.9	53.2
Collaborative and productive work by pupils	95.4	80.5	95.0	96.3	98.8	94.2	96.9	95.1	94.8
Computer/internet should not be used for any of these in teaching	0.3	0.6	0.3	0.0	0.0	0.7	0.0	0.2	0.4

Source: *LearnInd CTS 2006;* ***Base:*** *all teachers;* ***Question:*** *Q13: "What do you think for what computers and the internet should be used for in teaching?"*

Access, Competence and Motivation for Using ICT and the Internet in Schools

Access

The majority of Danish teachers are more or less satisfied with the technical access means at their schools: 83% state that their school is well equipped with computers and 84% express the opinion that their internet connection is fast enough. However, 56% wish there were better support and maintenance actions taken. In terms of content a considerable minority states problems with respect to finding adequate learning materials (38%) and argue that existing materials are of poor quality (35%).

Competence in using ICT

Danish teachers feel most competent at using e-mail and using a text processor programme but are less confident with downloading and installing software and with using presentation software packages.

The upper secondary level and vocational school teachers seem to be more ICT competent than those in primary and lower secondary schools. While between 35% and 45% of upper level school teacher are mentioned as having insufficient ICT skills, this figure reaches 53% and 57% in primary and lower secondary schools.

Motivation for ICT use in Schools

81% of Danish teachers see significant learning benefits for pupils using computers in class and as many say that pupils are more motivated and attentive when computers and the internet are used in class. Only a very few (15%) state the opinion that using ICT in class does not have significant learning benefits for pupils.

Teachers' access, competence and motivation for using ICT in class 2006

Percentage of teachers agreeing or strongly agreeing:	Total DK	Total EU25	Educational Level				Subject of teaching					
			Primary	Lower secondary	Upper secondary	Vocational	General primary	Literature and languages	Humanities and social sciences	Science, maths, computer sciences	Physical, artistical, crafts education	Vocational education
Access												
Our school is well equipped with computers [a]	82.5	74.2	83.3	79.9	88.7	87.0	79.6	79.2	92.2	86.3	78.8	80.8
The internet connection we have is sufficiently fast [b]	83.7	77.2	80.8	82.2	86.3	87.5	82.9	78.1	88.4	84.0	85.5	86.5
Better technical maintenance and support is required in our school [c]	55.9	64.8	59.3	58.6	50.5	46.6	60.0	59.5	44.3	57.5	57.2	52.1
Existing teaching materials on the Internet are of poor quality [d]	34.5	29.9	34.5	33.7	36.8	35.6	30.4	32.8	39.9	35.5	40.0	42.2
It is hard to find adequate learning materials for teaching [e]	37.7	38.7	35.9	38.0	34.8	37.2	33.9	38.0	44.4	39.7	35.9	43.0
Motivation												
Pupils are more motivated and attentive when computers and the internet are used in class [f]	80.9	86.3	84.0	80.4	81.1	72.9	83.9	82.7	79.8	81.2	81.8	71.2
Using computers in class does not have significant learning benefits for pupils [g]	14.7	20.7	12.9	15.5	10.5	15.8	15.2	16.7	15.1	11.5	17.6	20.4
Competence												
Teachers in our school do not have sufficient computer skills [h]	52.1	42.0	52.7	56.7	35.0	44.9	51.1	49.6	47.1	55.1	52.8	48.6
Competence / computer skills (Percentage of teachers who feel very confident at…)												
Using text processors [i]	81.7	65.0	82.6	81.7	84.6	75.4	80.3	79.3	77.6	84.7	82.5	61.4
Creating electronic presentations [j]	39.3	34.0	38.5	36.8	43.2	48.3	30.7	31.0	39.3	47.6	34.8	36.8
Using e-mail [k]	88.8	65.9	88.8	87.0	94.0	91.6	87.4	88.7	88.0	89.1	91.1	87.2
Downloading and installing software [l]	42.8	35.8	42.4	42.1	49.6	41.0	31.2	34.8	40.4	53.4	40.8	31.4

Source: *LearnInd CTS 2006;* ***Base:*** *a-h All teachers; i - l Teachers using computers in class* ***Question:*** *a-h Q14, i-l Q11.*

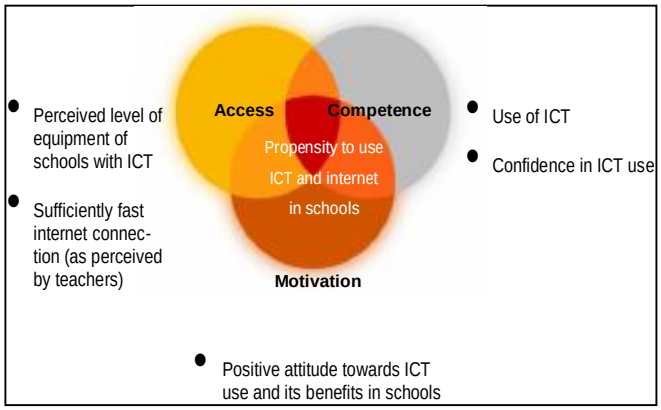
ICT Readiness of Teachers – the ACM Model

The ACM model as developed by Viherä and Nurmela (2001)[4] was applied in LearnInd to generate a typology according to the "propensity to the use of computers and internet by teachers in classroom situations at schools".

The typology in the figure below takes account of the three main categories of preconditions which need to be given for a school to make use of computers and the internet in the teaching process in classrooms, computer labs etc.

These are: access (to computers and the internet at school), competence (in using the computer software and the internet, and applying it for teaching purposes), and motivation (gauged through the attitude that using computers in classrooms results in significant learning benefits).

The Access-Competence-Motivation Model



Any attempt to group the classroom teachers according to their propensity to becoming users of computers and

the internet in their teaching processes needs to take account of these three dimensions. In the present application of the ACM model data from the Classroom Teacher Survey (CTS) was used. Therefore "access" for instance is to be understood as a perceived level of computer equipment at schools and teachers' satisfaction therewith rather than an objective measure of equipment status.

38% of European teachers dispose of sufficient access to the internet at school, the necessary competence in using ICT in class and are motivated to its use. With 49% of the teachers belonging to this group, Denmark is in the top quarter of European countries. Overall the UK with 60% ranks top and Latvia with 15% finds itself at the very end.

The as yet insufficient internet connection in many schools and a lack of motivation of teachers for using ICT are the most critical issues for a wider uptake of computers and the internet in schools in Europe. 20% of European teachers indicate insufficient computer equipment and the low speed of internet connection at their school as key barriers. 14% show a lack of motivation, i.e., they are of the opinion that using computers in class does not result in significant learning benefits.

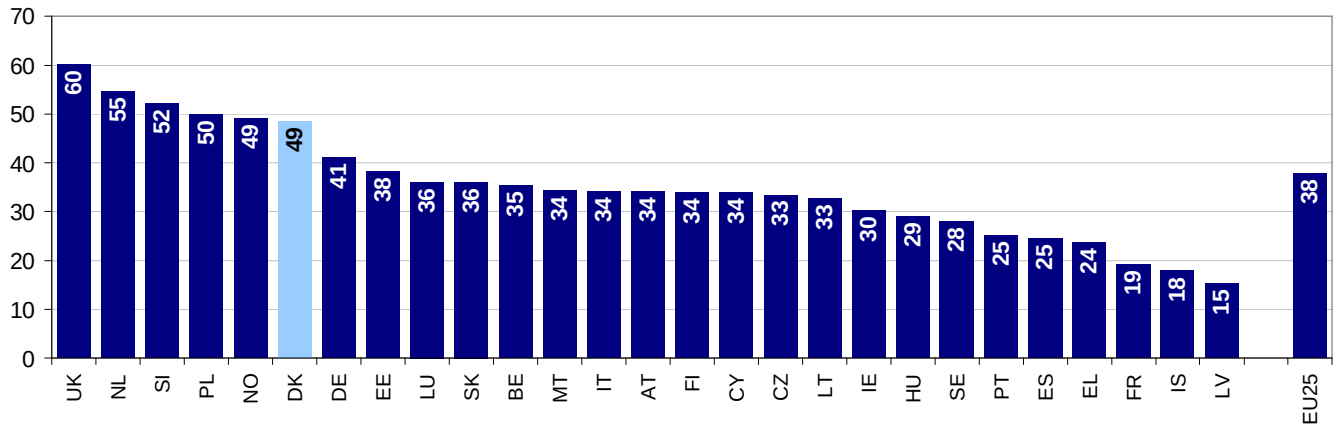
The situation in Denmark reveals that a lack of motivation for using ICT in class of 20% of the Danish teachers seems to be most critical in a country where ICT is already used very widely and is fully integrated in the subjects in all types of schools and for a multitude of purposes.

Access, Motivation and Competence of Teachers for Using ICT in Schools in Denmark 2006

DK	EU25	Access	Competence	Motivation
1.6	4.3	~~Access~~	~~Competence~~	~~Motivation~~
1.2	3.9	**Access**	~~Competence~~	~~Motivation~~
7.0	9.7	~~Access~~	**Competence**	~~Motivation~~
1.7	5.0	~~Access~~	~~Competence~~	**Motivation**
19.3	13.7	**Access**	**Competence**	~~Motivation~~
2.2	4.8	**Access**	~~Competence~~	**Motivation**
18.5	20.7	~~Access~~	**Competence**	**Motivation**
48.6	37.9	**Access**	**Competence**	**Motivation**
100	100			

Percentage of teachers. ***Source:*** *LeanInd CTS 2006;* ***Base:*** *All teachers;* ***Question:*** *See endnote* [5]

ICT Readiness of Teachers in Denmark: Percentage of Teachers Fully Ready to use Computers in Class (ACM Indicator) 2006



Source: *LeanInd CTS 2006;* ***Base:*** *All teachers.* ***Question:*** *See endnote 5*

ANNEXES

Methodology Report

Universe / Sample population

In order to assure the comparability of school levels in all countries UIS-OECD-EUROSTAT "Mapping of national education programmes to ISCED 97 for school academic/year 2002/2003" [6] was used for composing the sample frame. Based on this, each country divided its school system into ICSED codes and made different combinations that existed in its country.

Sampling frame and method

The sample was composed using official databases, which contained contact data of schools. In the majority of countries the sample was drawn from a database received from the Ministry of Education.

For each country a separate template of sample frames was composed by TNS Emor. These templates contained data about school types across regions as well as location type. School types were defined based on the ISCED codes provided in UIS-OECD-EUROSTAT. Location type distribution was made according to the Eurostat type of locality classification which differentiates densely populated, intermediate and thinly populated municipalities[7]. Apart from that, each country was divided into 3-7 regions depending on the size of a country.

Based on the data provided by countries, TNS Emor composed quotas for each country. Two level stratification was used – quotas for first stage, random sample for second. The quotation for region by school type and location type was endorsed. Simple random selection was conducted by the local agency or the local source of the contact base. Both private and public schools were included in the sample. It was also obligatory to include schools of other teaching languages than the official language of a country in the sample.

Simple random sampling was used inside a quota cell. This means that if the quota for primary schools in region1 was 100 and the total number of primary school in this region was 800, then a random sample selection was be made among those 800 schools. This covered also both private and public schools and schools of other teaching languages than the official language of a country.

No more than 50% of interviews could be made in one school level. At least 10% of respondents had to be from schools which provided professional/vocational or combined programme of vocational and upper secondary level education (in case a country did not have special quota for those schools). It did not matter whether vocational education level was coded as ISCED 3 or ISCED 4.

There were no duplications in samples of head teacher and classroom teacher surveys. This was only allowed in countries with small universe sizes (e.g. Malta, Cyprus, Iceland, Estonia, Latvia etc) and in cases where the last quota cells were very difficult to achieve or there were not enough schools of a certain type. The priority was to include as many different schools as possible. In both surveys, 5 attempts were made before giving up and only if the respondent refused was this person not contacted again.

The CATI programme generated a randomly chosen letter. The interviewer asked for the person with a surname that started on the generated letter. If there was more than one teacher whose surname started with the selected letter, the person who was first alphabetically was chosen. If the correct person was not available, an appointment was made. At least 5 attempts were made before taking another teacher.

Only in Malta, due to instructions dictated by the Education Department, the Head Teacher would randomly select a teacher who would be available for an appointment during which they would be interviewed.

Number of interviews conducted (HTS / CTS)

Country		Head Teachers	Classroom teachers
BE	Belgium	450	807
CZ	Czech Republic	500	1000
DK	Denmark	315	848
DE	Germany	450	901
EE	Estonia	400	851
EL	Greece	500	1000
ES	Spain	518	1022
FR	France	501	869
IE	Ireland	403	626
IT	Italy	500	900
CY	Cyprus	150	600
LV	Latvia	451	902
LT	Lithuania	457	908
LU	Luxemburg	82	277
HU	Hungary	500	1000
MT	Malta	100	200
NL	Netherlands	515	890
AT	Austria	320	450
PL	Poland	500	1000
PT	Portugal	450	900
SI	Slovenia	253	460
SK	Slovakia	502	1000
FI	Finland	318	601
SE	Sweden	200	450
UK	United Kingdom	450	905
IS	Iceland	177	424
NO	Norway	494	708
TOTAL		**10456**	**20499**

Fieldwork

Fieldwork was coordinated by the TNS Emor and conducted in cooperation with its local TNS offices excluding Iceland, Cyprus, Austria, Slovenia and Malta where TNS does not have offices. In these countries partners with whom TNS had previous experience were used.

Pilot interviews prior to the regular fieldwork were conducted with 20 schools in both target groups in Estonia and Greece in February 2006, in order to test the questionnaire (structure, comprehensibility of questions).

Between March and April 2006, surveys among head teachers (head teacher survey - HTS) and classroom teachers (CTS) were carried out in 27 European countries. TNS Emor was responsible for the fieldwork.

Weighting schemes

After the fieldwork, weighting coefficients were computed using region, location type and school type.

Statistical accuracy of the survey: confidence intervals

Statistics vary in their accuracy, depending on the kind of data and sources. A "confidence interval" is a measure that helps to assess the accuracy that can be expected from data. The confidence interval is the estimated range of values on a certain level of probability of error. Confidence intervals for estimates of a population fraction (percentages) depend on the sample size, the probability of error, and the survey result (value of the percentage) itself. Further to this, variance of the weighting factors has negative effects on confidence intervals.

The calculation of confidence intervals is based on the assumption of (quasi-) infinite population universes. In practice, however, in some countries and for some school levels the complete population of schools consists of only several hundred or even a few dozen of schools. In some cases, literally each and every school within a country-school type cell was contacted and asked to participate in the survey. This means that it is practically impossible to achieve a higher confidence interval through representative school surveys in which participation is not obligatory.

Country Background Data

In Denmark with a total population of 5,351 million inhabitants, the fertility rate and the number of children aged 0 – 14 years is considerable, the annual population growth rate remains low. Less pupils than in other countries are taught by one teacher, resulting in the best European pupil/teacher ratio. Denmark is also the frontrunner in expenditure on education as a percentage of GDP. The supremacy of the GDP is accompanied by a weak GDP Growth rate.

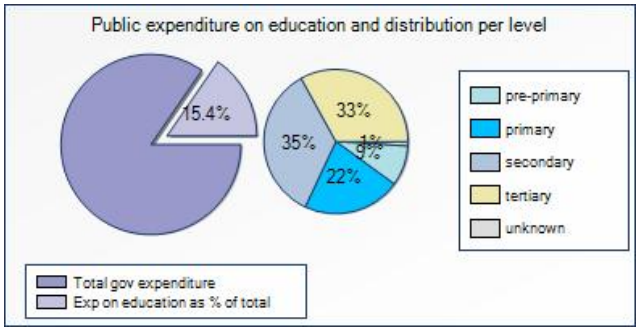
General Population Data for Denmark 2002/03[8]

Total population (000)	5,351
Annual population growth rate (%)*	0.3
Population 0-14 years (%)	19
Rural population (%)*	15
Total fertility rate (births per woman) *	1.7
Infant mortality rate (0/00) *	4
Life expectancy at birth (years) *	77
GDP per capita (PPP) US$ *	30,907
GDP growth rate (%)*	1
* World Bank World Development Indicators	

Resources for Education in Denmark 2002/03

Pupil / teacher ratio (primary)	10
Public expenditure on education :	
as % of GDP	8.5
as % of total government expenditure	15.4
Distribution of public expenditure per level (%):	
pre-primary	9
primary	22
secondary	35
tertiary	33
unknown	1

Resources for Education in Denmark 2002/03



The Educational System in Denmark[9]

In 2001, there were 677,880 children of compulsory school age, and approximately 35.5% of the population aged 15-34 was receiving education – with 82.8% for the 15-19-year-olds. The language of instruction is Danish.

In 2001, 85.1% of the pupils attended public-sector primary and lower secondary schools, and 14.9% attended private institutions, which receive approximately 85% of their operational funding from the State. Primary and lower secondary education is largely the responsibility of the Ministry of Education, while the Ministry of Social Affairs is responsible for some areas of pre-school. The Ministry of Culture is responsible for the artistic tertiary education. Long tertiary university courses and research programmes are under the auspices of the Ministry of Science, Technology and Innovation, while the Ministry of Education is responsible for short and medium tertiary education.

The legislation covers the aims and framework of education, funding and in some cases curricula, examinations and staffing. The Ministry of Education jointly oversees the one year of pre-school class and the *folkeskole* with the municipal councils. The Ministry of Education shares control of the *gymnasium* and *Højere Forberedelseseksamen* with the county councils and school or course boards.

The Ministry of Education controls vocational education and training. Higher education is under the responsibility of the Ministry of Education, the Ministry of Cultural Affairs, and the Ministry of Research.

There is no national inspectorate, although there is a national corps of subject advisors. Inspection is the responsibility of the municipal or county authorities, which also offer teaching support centres.

The use of ICT in Education[10]

As initiated by the government, an action plan for ICT is implemented in the field of primary and lower secondary education for 2004-2007. In practically all executive orders on education, it is set out that ICT should be integrated in individual subjects where deemed appropriate. This project is funded with a total amount of DKK 500 million. DKK 50 million is earmarked for the development of new forms of online teaching material.

75% of the funding is earmarked for ensuring that pupils in the lowest grades have access to computers as a daily, personal tool. The integration of ICT in teaching is considered an advantage for both low and high performing pupils, in that ICT is also used as a tool to improve the regular cooperation between teachers and pupils in all age groups.

In vocational education and training, individual teaching with requirements for differentiation and inclusion has contributed to a heavily increased use of ICT-based learning activities and adds a strain of ICT to exams. Additionally, a national learning resource repository will be developed and funded with DKK 50 million.

At the initiative of the Ministry of Education, a project on ICT, Media and the primary and lower upper education (ITMF) was carried out, and results indicate that systematic use of ICT as a tool and medium in concurrence with organisational change may contribute to schools reaching the aims on differentiated teaching as set out in the Act on the Folkeskole (primary and lower secondary education).

The Study

There is a lack of information on the actual use of ICT for learning in schools, and for supporting political action in potential future programmes. It is necessary to clarify matters such as the educational vision of heads of schools, the current impact of ICTs on teachers' practice, support and training and on other factors for success in e-learning.

The objective of the study is to obtain estimates for the eEurope 2005 indicator on e-learning "number of pupils per computer with Internet connection (broadband/non-broadband)" and relate it to other possible indicators of educational use of ICT in compulsory education (e-learning in schools). The study looks at how Information and Communication Technologies (ICT) are used in schools.

The study is a continuation of the earlier benchmarking exercise for eEurope 2002.

It involved two surveys. Firstly of head teachers to obtain information on the schools and then of teachers to focus on their use of ICTs in the teaching process

This exercise is part of the Information Society monitoring and benchmarking process for which the Commission in cooperation with the Council defined benchmarking indicators.

Country Briefs

This document has been prepared by **empirica** based on own desk research and the above mentioned primary data sources: Head Teacher Survey (HTS) 2006 and Classroom Teacher Survey (CTS) 2006 in the EU25 member states, Iceland and Norway. .

Altogether 27 LearnInd Country Briefs are available in a common format, one for each member of the enlarged European Union, Norway and Iceland.

A final report has also been developed. It includes approximately 100 exhibits, more than 250 data tables and a report about the key results.

You can access and download these documents in PDF format (for free) from http://ec.europa.eu/information_society/eeurope/i2010/benchmarking/index_en.htm.

More information

Check our results and achievements on: http://ec.europa.eu/information_society/eeurope/i2010/benchmarking/index_en.htm. If you wish to be provided with more details, or to receive news and updates, please contact us at: **learnind@empirica.com** or get in touch with us.

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1 Note that "in class" means during lessons while teaching and does not denote a particular location such as a classroom.

2 Base (100%) = all teachers who have used a computer in class in the last 12 months.

3 This section includes some comparisons of the Eurobarometer Flash 94/1001 and 95/102 results from 2001 with those from the LearnInd surveys from 2006. Please bear in mind that the figures are not directly comparable due to the use of slightly different approaches and methodologies.

4 Viherä, M-L, Nurmela, J (2001) "Communication Capability Is an Intrinsic Determinant for Information Age", in Futures, Volume 33, Issue 3-4:245-265.

5 Synthetic indicators: Access: Q14 (2) "Our school is well equipped with computers" and Q14 (3) "The internet connection we have is sufficiently fast ".

Competence: Q11 How confident do you feel... a) using a text processor, b) creating a presentation c) using e-mail, d) downloading and installing software. Threshold: Average of 2.5 or more on a 1-4 confidence scale

Motivation: Q14 (8); disagree to "Using computers in class does not result in significant learning benefits".

For full question wordings refer to questionnaire.

6 http://forum.europa.eu.int/Public/irc/dsis/edtcs/library?l=/public/unesco_collection/programmes_isced97&vm=detailed&sb=Title

7 Densely populated area refers to a set of closely related local units, each one of which having a density greater than 500 inhabitants per km2, and the total population of which being of at least 50 000 inhabitants; Intermediate area refers to a set of closely related local units that do not pertain to a densely populated area, each one of which having density greater than 100 inhabitants per km2, and where the total population is at least of 50 000 inhabitants or it refers to a set that is adjacent to a highly populated area. Thinly populated area (rural): refers to a set of closely related local units that are not part of a densely populated area, or of an intermediate area. (A set of local areas totalling less than 100 km², not reaching the required density, but entirely enclosed within a densely-populated or intermediate area, is to be considered to form part of that area. If it is enclosed within a densely-populated area and an intermediate area it is considered to form part of the intermediate area).

8 Source: http://www.uis.unesco.org/profiles/selectCountry_en.aspx (visited 28 March 2006)

9 Source: http://www.eurydice.org/Documents/struct2/frameset_EN.html (visited: 28 March 2006)

10 Source: http://europa.eu.int/comm/education/policies/2010/nationalreport_en.html (visited: 9 May 2006)